

## NOTES.

SIR J. J. THOMSON, F.R.S., has been elected a corresponding member of the Berlin Academy of Sciences.

THE principal trustees of the British Museum have appointed Mr. Walter Campbell Smith, of Corpus Christi College, Cambridge, to an assistantship in the mineral department.

PROF. E. P. DI SESSA (Rome), Prof. E. G. Warburg (Charlottenburg), Prof. J. H. Poincaré (Paris), Prof. Alexander Graham Bell (Washington), and Prof. P. N. Lebedew (Moscow), have been elected honorary members of the Royal Institution.

THE sixth annual exhibition of electrical, optical, and other physical apparatus, arranged by the Physical Society, will be held at the Imperial College of Science, Imperial Institute Road, South Kensington, on Tuesday, December 20.

At the request of the council of the Royal Society of Arts, Sir Edward Grey, Secretary of State for Foreign Affairs, authorised the transmission of the society's Albert medal to his Majesty's Ambassador at Paris for its presentation to Madame Curie. Sir Francis Bertie received Madame Curie at the British Embassy on November 25, and handed to her the Albert medal, telling her that he had been instructed by the Secretary of State to present it to her on the part of the Royal Society of Arts in recognition of the services rendered to the world by her discovery of radium, and adding that it gave him great pleasure to be the medium of carrying out the wishes of the society.

IN view of the candidature of Madame Curie for membership of the Paris Academy of Sciences, great interest attaches to the discussion at the last monthly meeting of the central administrative committee of the five French academies, on the admission of women as members of the Institut de France. According to the Paris correspondent of the *Times*, the committee was unable to agree, and it was decided, finally, that the question should be remitted to the administrative committees of the various academies, that their decisions should be considered at the next sitting on December 28, and that the whole question should be then transferred to the plenary trimestral united sitting of all the academies on January 4. It may be mentioned here that Madame Curie has just been elected an honorary foreign member of the Stockholm Academy of Sciences.

THE Vienna correspondent of the *Times* states that Mr. Alton, of the Radium Institute in London, has bought from the Austrian Ministry of Works, on behalf of Sir Ernest Cassel, 1 gram of radium for the sum of nearly 15,000l. The radium is a gift by Sir Ernest Cassel to the institute, and is intended for use in cancer research. One half of the gram is now being tested at the Vienna Radium Institute, and will be sent to England next month. The other half is being extracted from the pitchblende at Joachimsthal, and will be available in three or four months. Mr. J. W. Gifford, of Chard, Somerset, has announced to Prince Alexander of Teck, chairman of the Weekly Board of the Middlesex Hospital, his intention of presenting 40 milligrams of radium to the cancer research laboratories of that institution for the prosecution of their investigations. At current rates this quantity of radium, weighing approximately one seven-hundredth of an ounce, is worth about 600l.

THE following are among the lecture arrangements at the Royal Institution before Easter :—Prof. Silvanus P. Thompson, a Christmas course of six illustrated lectures on sound, musical and non-musical, a course of experimental acoustics, adapted to a juvenile auditory; Prof. F. W. Mott, six lectures on heredity; Dr. A. E. H. Tutton, three lectures on crystalline structure: mineral, chemical, and liquid; Dr. M. Aurel Stein, three lectures on explorations of desert sites in Central Asia; the Astronomer Royal, Mr. F. W. Dyson, three lectures on recent progress in astronomy; Dr. P. Chalmers Mitchell, three lectures on problems of animals in captivity; Prof. Arthur Keith, two lectures on giants and pygmies; Prof. W. A. Bone, two lectures on surface combustion and its industrial applications; Sir J. J. Thomson, six lectures on radiant energy and matter. The Friday evening meetings will commence on January 20, when Sir James Dewar will deliver a discourse on chemical change at low temperatures. Succeeding discourses will probably be given by Prof. W. H. Bragg, Mr. A. E. Shipley, Prof. H. E. Armstrong, Prof. Jean Perrin, Prof. Karl Pearson, Mr. J. H. Balfour Browne, Sir David Gill, Prof. H. S. Hele-Shaw, Sir J. J. Thomson, and other gentlemen.

AN important question with regard to the distribution and occurrence of the various species of tsetse-flies in Africa is to what extent the areas infested by them remain constant. It has long been known that in a given tract of country certain parts harbour tsetse-flies, while from other parts they are absent; but of late years an impression has grown up that these areas are liable to change, and that the fly is spreading. Sir Alfred Sharpe, in a memoir on the habits of *Glossina morsitans* in Nyasaland (Bulletin of Entomological Research, vol. i., part iii.), is of opinion that fly-areas do not alter their limits to any appreciable extent. He states, however, that within the area, fly may sometimes be found in one part, sometimes in another, and in very variable quantity at different times. He believes that the numbers of the fly depend largely on the season of the year, but also on other causes impossible as yet to define. On the other hand, Mr. P. E. Hall communicates to the same journal some notes on the movements of *G. morsitans* in N.E. Rhodesia, and indicates on a map a number of areas which, to the best of his knowledge, were clear of fly up to 1906, but are now fly-infested. This conflict of opinion (perhaps more apparent than real) shows how urgent is the need of systematic investigations by expert entomologists upon these and other questions relating to the bionomics of tsetse-flies.

IN the *Philippine Journal of Science* for June Dr. R. B. Bean, of the Anatomical Laboratory, Manila, reports the discovery of a living specimen in the island of Luzon which he believes to bear close relationship to the Palæolithic type represented by the Neanderthal skull. The massive lower jaw with its square ramus and receding chin, the low cephalic index (73.68), heavy brow ridges, rounded orbits, large nasal apertures and high nasal index (102.2), combined with small stature (156.8 cm.), muscular frame and short femur, all approximate to a form similar to that of the antediluvian man of Europe, *Homo heidelbergensis*. Dr. Bean in the same issue of the Journal continues his study of the racial anatomy of the people of Taytay, dealing here with the women, whom he finds to be more primitive than the men, and closely resembling the women of Siberia. The Blend type is largely primitive in character, and the Austroloid variety comes between the Iberian and the primitive.

IN the first part of the Journal of the Royal Anthropological Institute Mr. W. Crooke discusses the origin of the Rajputs and Mahrattas, the warrior tribes of India. He identifies among the former a considerable intermixture of Central Asian blood derived from the Hun invasions, and he holds that they constitute a status group developed from a stock of which the lower grades are now represented by the Jats and Gujars of the Punjab. The Mahrattas he also considers to be a status group developed from the Kunbi tribe, and now claiming affinity with the Rajputs. He questions the validity of the suggestion that the brachycephalic element in southern India is the result of emigration of Huns or Scythians under pressure from the Aryans. It may be more reasonably accounted for by a prehistoric movement of races from the west either by the land route or in the course of commerce which existed with the Euphrates valley from a very early period.

OUR note in NATURE of November 24 (p. 114) upon the suggested inversion of the expression "thunder and lightning" leads another correspondent to point out that the phrase "animals and birds," inadvertently used on the same page, is open to the objection that it suggests that birds are not animals. He proposes the term "beasts, birds and fishes" as comprehensive and sufficiently distinctive.

DR. R. HORST has favoured us with a copy of an account of a new species of peripatus (*Paraperipatus lorentzi*) from Dutch New Guinea, published in vol. xxxii. (pp. 217-8) of Notes from the Leyden Museum. The species, which is fortunately represented by a male and a female, is of interest as filling a gap in the distribution of the group. The two specimens were discovered in moss on Mount Wichmann, at a height of between 9000 and 10,000 feet. In colour the new species is dark greenish-blue, becoming somewhat paler on the under side, and with a median central row of small whitish spots.

WHEN Dr. J. Huber succeeded Prof. E. A. Goeldi as director of the Museu Goeldi (Museu Paraense) in March, 1907, the opportunity was taken of reorganising the staff of that institution on a new and improved footing. These changes, as well as the general progress of the museum, are recorded in the reports for 1907 and 1908, which form the first portion of vol. vi. of the *Boletim do Museu Goeldi*, which, although relating to the year 1909, has only just been published. The zoological gardens attached to the museum, which are largely devoted to the exhibition of the animals of the country, appear to be in a thriving condition, having received a large number of accessions during the period under review.

THE pharyngeal teeth of fishes form the subject of an article, by Colonel C. E. Shepherd, in the November number of the *Zoologist*. These organs, except in the case of the wrasse and carp groups, have, according to the author, received but scant attention at the hands of naturalists. After referring to their different structural types, Colonel Shepherd expresses the opinion that pharyngeal teeth are probably the chief masticating organs, as they are undoubtedly in carp and wrasse. Fish-eating species, which swallow their prey whole, would have the action of the gastric juice facilitated if the bodies of the fishes swallowed had the scaly coat broken by means of the pharyngeal teeth. These teeth also assist in working the food down into the oesophagus.

THE local pearl and pearl-shell fishery forms the subject of an article by Mr. A. Scale in the July number (vol. v., No. 2) of the *Philippine Journal of Science*. Two

species of pearl-oyster are found in Philippine waters, the valuable gold-lip, *Margaritifera maxima*, and the less precious black-lip, *M. margaritifera*. With the exception of those used in a factory at Manila, which is capable of turning out about 6000 gross of buttons per month, and consumes about 300 tons per annum, all the shells are exported to Singapore or Europe. Although almost the whole area from Sibutu Passage to Basilan Strait and the south shore of Mindanao is a potential pearl-bank; most of the banks have been over-fished, and it is now difficult to find productive ones. One bank was recently found in which all the shells were dead, and so corroded as to be valueless. The fisheries afford a fair yield of pearls, although much less than the Ceylon output, which comes from a smaller species, with shells of little value. On the other hand, some of the finest known pearls are the product of the Sulu fishery. The Japanese are producing pearls, although not of good shape, by introducing foreign objects into the oysters, and the author states that within the next few years it will be possible to produce perfectly spherical pearls of good lustre.

TO the Proceedings of the U.S. National Museum, No. 1778, Messrs. Everman and Latimer communicate the first complete list of the fishes of the Lake of the Woods and neighbouring waters, so far as at present known. Although the Lake of the Woods, which forms the receptacle for the waters of Rainy River, lies mainly in Ontario, its southern border is situated on the northern frontier of Minnesota, and therefore belongs to the United States. On account of the recent treaty between Great Britain and the United States, which provides for the federal control of the fisheries in these waters, an account of their fish-fauna is a matter of some importance at the present time. The fisheries in the Lake of the Woods, which are carried on by means of nets, are of very large economical value, having yielded in 1909 a total sum of 42,193 dollars, of which 28,051 pertained to the United States and 14,142 to Canada. In 1894 the total value was, however, as much as 81,337 dollars. The most valuable product is the great lakes sturgeon (*Acipenser rubicundus*), which formerly swarmed in Lake of the Woods, and in 1893 yielded no fewer than 26,000 dollars, although of late, like that of the rest of the fishery, the yield has been much less. During the last few years a slight increase in the catch is, however, reported, but this may be due to closer fishing.

IN connection with the preservation of localities where rare plants or special plant associations are found, attention is directed to a paper, by Mr. A. R. Horwood, on the extinction of cryptogamic plants, published in the Transactions of the South-Eastern Union of Scientific Societies (1910). The author discusses the numerous factors that lead to the extinction of plants, and presents the results of special inquiry with regard to Ireland, where perhaps the most destructive factor is the collector, who in the south-west counties raids the ferns *Trichomanes radicans* and *Osmunda regalis*.

IN the *Victorian Naturalist* (vol. xxvii., No. 6) is published a report by Mr. J. W. Audas on a botanical expedition in the Victorian Alps, and a list of plants recorded from the district that has been compiled by Dr. A. J. Ewart. Out of 334 species, one-third belong to the three families Compositæ, Leguminosæ, and Myrtaceæ, while the families Saxifragaceæ and Ericaceæ are only represented by *Bauera rubiginosa* and *Gaultheria hispida*; a single gentian, *Gentiana saxosa*, is found. The one endemic plant is a bushy labiate, *Westringia senifolia*.

Among the plants observed by Mr. Audas about an altitude of 5000 feet were the shrubs *Eriostemon myoporoides*, *Helichrysum rosmarinifolium*, and *Kunzea Muelleri*; near the summit of Mt. Hotham he found the grass-like umbellifer, *Aciphylla glacialis*, and a tufted carophyll, *Scleranthus biflorus*.

MR. E. P. STEBBING presents in Forest Pamphlet No. 15, published by the Government of India, a note on the preservation of bamboos from the attacks of the bamboo beetle or "shot-borer." The destructiveness of this insect, *Dinoderus minutus*, may be gauged from the fact that bamboos generally last in India only for a year or eighteen months. Cooperation between the author and the Indian Telegraph Department has resulted in the evolution of an effectual method of treatment, which consists in soaking the bamboos for five days in water, when they exude a gelatinous substance, and then immersing in Rangoon oil for forty-eight hours. The object of the bulletin is to record the experiments undertaken and the results, showing that the oil has effectually preserved bamboos treated in 1904 up to the time of writing in 1909.

THE *Agricultural Journal of British East Africa*, recently to hand (vol. iii., part i.), contains a short article by Dr. Bodeker on native methods of fishing in relation to the incidence and dissemination of sleeping sickness. Fishing is attended with grave danger to all natives in the vicinity wherever *Glossina palpalis* is found. Several districts where formerly a large population of fishermen dwelt are now uninhabited as a result of the disease. Among remedial measures, the destruction of the thin strip of bamboo canes along the whole coast-line is recommended. In another article Mr. MacDonald urges the advantages of maize as a crop for export. It can be grown readily and at comparatively low cost over a large area of the country, and, so far, it has not been infested by any seriously destructive pest. Railway rates to the coast being now much reduced, it becomes possible to send the maize to Great Britain or to the Continent, where the demand is practically unlimited.

A TABLE is given in a recent issue of the *Journal of Agriculture of South Australia* (vol. xiv., No. 1) showing how the use of fertilisers for cereals has increased during the past thirteen years. From 1898, the first year given in the table, to the current year the increase has been continuous; some of the figures are as follows:—

Year	Quantity of manure used		Area of cereal crop manured	
	Tons		Acres	
1898	12,500	...	250,000	...
1899	16,500	...	350,000	...
1907	61,000	...	1,366,400	...
1908	65,000	...	1,456,000	...
1909	76,500	...	2,100,000	...
1910	87,000	...	2,320,000	...

A few soil analyses are recorded in another article, from which it appears that the soils are very different from our own. The nitrogen varied from 0.026 to 0.091 per cent., the phosphoric acid from 0.010 to 0.045 per cent., and the potash from 0.044 to 0.82 per cent. All these values are much lower than in ordinary English arable soils.

THE Natal Museum has issued a catalogue of a collection of rocks and minerals from Natal and Zululand arranged stratigraphically by Dr. F. H. Hatch. The specimens were collected by Dr. Hatch during the winter months of 1909. Beginning with the oldest rocks, the order of arrangement is:—(1) metamorphic rocks, Swaziland system; (2) granites intrusive in the metamorphic rocks of the Swaziland system; (3) Waterberg or Table

Mountain sandstone; (4) rocks of the Karroo system; (5) surface deposits. The collection of specimens is a duplicate of one which Dr. Hatch proposes to present to a London museum.

IN a paragraph upon the recently discovered ice-cave near Obertraun, Upper Austria, which appeared in *NATURE* of October 13 (p. 469), Prof. E. Fugger was described as one of the explorers of the cave. Prof. Fugger asks us to state that he has not yet personally examined the cave, and that the information he kindly sent at our request was provided by Herr Alexander von Mork, who took part in the exploration of it. The discoverers and first explorers of the cave were, according to reports in the Linz newspapers, Herren J. Lahner and Kling (Linz), J. Pollak (Wels), I. Bock (Graz), A. v. Mörk (Salzburg), and L. Kranl (Budapest).

MESSRS. OUTES AND BÜCKING have added notably to the discussion of the *tierras cocidas* of the Pampas beds of Argentina by publishing photographs of thin sections of the debatable materials ("Sur la structure des scories et 'terres cuites,'" *Revista del Museo de la Plata*, vol. xvii., p. 78, September). Scoriae are figured from Monte Hermoso which are undoubtedly of volcanic origin. These are contrasted with the fragmental earths, which contain, however, volcanic particles. When these earths are subjected to the action of fire, they show fluidal structures and a glassy ground between the surviving fragments, and certainly do not resemble the alleged "terres cuites" selected for comparison. True burnt earths are formed during agricultural operations near La Plata when the settlers wish to clear their ground by burning the surface-vegetation, and these are of the glassy type. It is urged, therefore, that the andesitic scoriae which occur in the earths of the Pampas beds cannot be regarded as products of superficial burning. The petrographic argument is immensely strengthened by the illustrations, and their production, if we may judge from a quotation made by the authors, seems due to certain remarks published in *NATURE* in 1909 (vol. lxxxi., p. 535).

IN the September Bulletin of the American Geographical Society, under the title of "Notes on the Description of Land Forms.—I.," Prof. W. M. Davis returns to his attack on the "empirical" method of description in a criticism of three recent geographical papers (German, Italian, and English). He urges that it is "ultra-conservative" to adhere to the empirical method when "the whole trend of modern physical geography is toward the use of explanatory description." It may be replied, however, that while the new "terms of origin" can be sometimes used with good effect by a physiographer of Prof. Davis's experience and confidence, they might be more misleading than any empirical description if employed wrongly or applied without sufficient warrant. It is not every traveller who could be trusted with the use of "mature insequent ravines," &c., as desired by Prof. Davis in his "Notes."

THE November issue of the *National Geographic Magazine* contains thirty-nine photographs in colour, which is the largest number of coloured pictures ever published in a single number of the magazine. These illustrations all deal with life and scenes in Korea and China, and together provide an excellent means of picturing the habits and customs of these Eastern peoples. The article which is illustrated by these pictures is by Mr. William W. Chaplin, who shows an intimate acquaintance with the countries he describes, and he also took the photographs

from which the pictures were made. Mr. Guy E. Mitchell contributes a well-illustrated paper on a "New Source of Power," in which he deals with the extensive beds of lignite in the United States. The State geologists have estimated that the lignite deposits in the United States, exclusive of Alaska, amount to  $740 \times 10^9$  tons, of which fully one-third belongs to the public lands. The total area underlain by lignite and sub-bituminous coal—coal mostly of little, if any, value in steam plants, but of great efficiency in gas producers—is 246,245 square miles. The U.S. Geological Survey fuel tests have showed that when coal is made into producer gas and then used in a gas engine, it has from two to three times the efficiency that it has when burned under a steam boiler in the ordinary way. Moreover, the experiments showed that lignite, which is useless for steaming purposes, can be used most successfully in the gas producer. Other articles in this issue of the magazine are "Kboo, a Liberian Game," by Mr. G. N. Collins; the "Pest of English Sparrows," by Mr. N. Dearborn; and "The Mistletoe," by Mr. W. L. Bray.

THE remarkable series of earthquakes that occurred in Alaska in September, 1899, is described in a valuable paper by Mr. Lawrence Martin (Bulletin of the Geol. Soc. of America, vol. xxi., 1910, pp. 339-406). The first known shock occurred on September 3, the last on September 29. In these four weeks there were four, possibly five, world-shaking earthquakes, and several hundred minor shocks. The strongest of all was the second great shock of September 10. It disturbed an area of probably not fewer than 432,000 square miles, and produced water-waves in Lake Chelan, Washington, which is nearly 1200 miles from the origin. Shore-lines were raised as much as  $47\frac{1}{2}$  feet, and depressed 5 feet or more in Yakutat Bay, and new reefs were uplifted. Sea-waves 20 or 30 feet high swept the shores. The Muir Glacier subsequently retreated eight miles in as many years, while other glaciers were subject to brief spasmodic advances. But, though the earthquake ranks among the greatest that have visited the American continent, there was no recorded loss of life among the twenty thousand inhabitants of the disturbed area, while the destruction of property was insignificant. This immunity was, no doubt, due to the fact that the people lived in tents, log cabins, or low frame buildings.

In *Bergens Museums Skrifter*. Ny Raekke., Bd. i., No. 1, Dr. A. Appellöf, of the Bergen Museum, describes the investigations on the life-history of the common lobster, upon which he has for a number of years been engaged. The monograph ("Untersuchungen über den Hummer") contains also a summary of previous work on the subject, and, as a whole, gives the best account of our knowledge of the natural history of the lobster which is at present available. With regard to the migrations of the animal, Dr. Appellöf, basing his opinion chiefly on the results of marking experiments, concludes that the lobster is a stationary animal, and remains in a very restricted area for many years, undertaking only short migrations, a conclusion which is of great importance when possible schemes for stocking a fishery by means of artificial rearing of lobster larvæ are under consideration. The author considers that the probability of increasing the supply of lobsters on the fishing grounds by means of artificial hatching, combined with the rearing of the larvæ until they reach the bottom-haunting stages, is very great, and refers to the successful rearing experiments carried out by Mead in the United States. The monograph is illustrated by a series of plates showing the various stages of development of lobster larvæ.

WE have received from Mr. A. Ghose a letter with reference to the review in NATURE of September 29 (p. 406) of his paper on "Manganese-ore Deposits of the Sandur State." Mr. Ghose points out that the Indian outputs of manganese ore were quoted incorrectly; our reviewer regrets the error, and supplies the correct figures as follows:—Production of manganese ore in the State of Sandur during 1908, 23,413 tons; during the quinquennial period 1904-8 (four years), 50,872 tons. Production of manganese ore in the Presidency of Madras during 1908, 118,089 tons; in the quinquennial period 1904-8, 513,845 tons. Production of manganese ore in the whole of India during 1908, 685,135 tons; in the quinquennial period 1904-8, 2,545,718 tons. The production of Sandur is therefore a little more than 3 per cent. of the whole output of India.

THE meteorological chart of the North Atlantic for December (first issue), published by the Meteorological Committee, has some interesting details of the two West India hurricanes experienced during October last. A cablegram from Havana on October 13 stated that the barometer was then falling, and later on a destructive cyclone passed over the south of Cuba, and was central between there and Cay West on October 15. On October 17 another storm of greater intensity (referred to in London newspapers on October 19) passed over Havana, and the island of Cuba is reported to have sustained the greatest material damage in its history. Several steamships were driven ashore by one or other of these hurricanes. Interesting synoptic weather charts are also given for the period November 10-16. These and the useful explanatory text indicate the existence of three high-pressure areas, one over the western American States, another to the north of Iceland, and a third which was gradually transferred from Europe to the region of the Azores. Over Europe as a whole the weather was dominated by depressions developed over the upper portion of the Atlantic, between the Icelandic and Azores high-pressure systems.

WE have received from the Abbé T. Moreux, director of the Bourges Observatory (Cher), a revised edition of his pamphlet entitled "Introduction to the Meteorology of the Future: the Sun and the Prediction of Weather." The Abbé is dissatisfied with the present method of forecasting weather for a day or two in advance. He points to the changes in the sun, which seem to have some connection with those on the earth, and asks whether this is not something more than a simple coincidence. He quotes step by step the progress made in tracing this connection from the time that Sir W. Herschel discussed the question of sun-spots (Phil. Trans., 1801, p. 265), and rapidly passes in review the labours of Schwabe, Wolf, and subsequent investigators down to the present day, and many references are given to the discussions which have appeared in our columns and elsewhere. The spectroscopic researches and discoveries of Sir Norman Lockyer and M. Janssen, and the establishment of the Solar Physics Observatory at South Kensington, are referred to as of prime importance; the former marked the epoch of extended observations on the simultaneity of solar and terrestrial changes, and the latter formed a base for similar inquiries in other parts of the world. The author observes that we have now an important groundwork of operations, and it must be maintained at any price.

IN two notes published in the *Bulletin International* of the Academy of Sciences of Cracow (March and April) Dr. Const. Zakrzewski communicates the results of measurements made by him on the dispersion of metallic

bodies in the visible spectrum. Two experimental methods were used:—(1) The author's "elliptic analyser," described by Dr. Zakrzewski in 1907, and used since with success by Herr Volke; as shown in the paper, this arrangement provides a comparatively exact way for the determination of the refractive index  $\nu$  and of the index of extinction  $\kappa$  for a metallic body. (2) A new scheme depending on the use, for the observation of ellipticity, of a convergent pencil of light; the results thus obtained are estimated to be correct within 5 per cent. of their values. Illustrative results for platinum, cobalt, and graphite are added. Maxwell's simple equation  $\nu^2 - \kappa^2 = \text{const.}$ , now given up on theoretical grounds, is found to hold true for graphite. The second correlative equation, however, asserting the proportionality of the product  $\nu\kappa$  with the period of vibration in the incident beam of light, does not agree with the observations.

An interesting address on "Comets and Electrons" was delivered by Prof. Augusto Righi to the Bologna Academy on June 22, and is published as No. 13 of *Attualità scientifica* (Bologna: Nicola Zanichelli, 1910, price 2.50 lire). In the paper Prof. Righi traces the growth and development of ideas regarding radiation-pressure, the successive proofs, disproofs, and reproofs of its existence for finite bodies, for minute solid particles such as are believed to exist in comets' tails, and for gaseous molecules, the theory of formation of the tails themselves, the electrical phenomena accompanying them, the escape of gases from planetary atmospheres, the nature of sun-spots and allied astrophysical phenomena. Prof. Righi, in conclusion, refers to the experiments conducted during the passage of the earth through Halley's comet, a large proportion of which gave rise to no definite conclusions. The following suggestive remark occurs in the paper:—"In this connection of the action of radiations on the individual molecules of a gas, and hence on the presence of gases in comets' tails, there has been once more verified the not uncommon fact that conclusions which are just, or regarded as such, are reached only by an asymptotic method, that is, after a series of successive corrections, and often, as in the present case, after having completed a series of successive oscillations, fortunately of decreasing amplitude, from one side to the other of the truth."

A COMMITTEE was appointed about two years ago by the Institution of Civil Engineers to investigate and report on questions connected with the use of reinforced concrete. A preliminary and interim report has now been issued giving information regarding the conditions under which reinforced concrete has been employed in engineering work in various countries, and the views of engineers having special experience in its use. The committee does not accept any responsibility for any of the statements contained in the report, and reserves its own views and recommendations until later. Hence the designer will still have to depend largely on the excellent report presented some time ago by the Royal Institution of British Architects, more especially as he will find difficulty in extracting definite information from the present report. The reader is expected to compare for himself the various statements of opinions contained in 262 pages of letterpress. The committee is now engaged upon tests and investigations in order to enlarge the knowledge at present available, and no doubt more definite information and conclusions will appear in a subsequent report.

MESSRS. NEWTON AND CO. have been granted a warrant of appointment as opticians to the King. They have held Royal warrants for more than sixty years.

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## OUR ASTRONOMICAL COLUMN.

EPHEMERIS FOR FAYE'S COMET, 1910e.—Dr. Ebell publishes a continuation of the ephemeris for Faye's comet in No. 4457 of the *Astronomische Nachrichten*; the following is an extract:—

Ephemeris 12h. (Berlin M.T.).						
1910	$\alpha$ (true) h. m.	$\delta$ (true)	log $r$	log $\Delta$	mag.	
Dec. 6 ...	3 37.1 ...	+ 3 44.0 ...	0.2270 ...	9.8717 ...	10.3	
" 10 ...	3 37.6 ...	+ 3 25.0 ...	0.2292 ...	9.8845 ...	10.3	
" 14 ...	3 38.5 ...	+ 3 12.8 ...	0.2316 ...	9.8985 ...	10.4	
" 18 ...	3 39.8 ...	+ 3 7.1 ...	0.2342 ...	9.9134 ...	10.5	
" 22 ...	3 41.6 ...	+ 3 7.5 ...	0.2371 ...	9.9290 ...	10.6	
" 26 ...	3 43.7 ...	+ 3 13.3 ...	0.2401 ...	9.9453 ...	10.7	
" 30 ...	3 46.3 ...	+ 3 24.1 ...	0.2433 ...	9.9621 ...	10.8	

This ephemeris is calculated from Prof. Stromgren's elements with a correction  $\Delta M.$ , and the time of perihelion is brought forward by about +8.91 days, to November 1.647 (Berlin M.T.); an observation at Teramo on November 23.4 gave a correction of  $-9s.$ ,  $-2.1'$ , to the ephemeris position.

RECENT HELWAN PHOTOGRAPHS OF HALLEY'S COMET.—Halley's comet was again photographed with the Reynold's reflector at the Helwan Observatory on November 7, 9, and 11, and the plates indicate a correction of +0.2m., 0', to the ephemeris published in No. 4450 of the *Astronomische Nachrichten*; the magnitude is estimated at about 14.5.

A telegram from Prof. Frost announces that Prof. Barnard observed the comet (presumably with the 40-inch refractor) at the Yerkes Observatory on November 11 at 17h. 17.8m. (M.T. Yerkes), and found its magnitude to be about 11.0; the observed position was

R.A. = 12h. 4m. 21.3s., dec. =  $-14^{\circ} 54' 15''$ .

From these observations it would appear that there is a marked difference between the photographic and visual magnitudes, and, curiously enough, it seems that the visual brightness is the greater (*Astronomische Nachrichten*, No. 4457).

THE TOTAL ECLIPSE OF THE MOON ON NOVEMBER 16.—Some interesting notes dealing with observations made during the recent eclipse of the moon appear in No. 21 of the *Comptes rendus* (November 21). MM. Luizet, Guillaume and Merlin, at the Lyons Observatory, observed the occultations of several stars, and found that in some cases the disappearances were not instantaneous. In two cases the star appeared to be projected on the disc before disappearing, and in one case contact with the limb preceded disappearance by three seconds. On the other hand several well-observed occultations and reappearances were quite sudden.

M. Montangerand, Toulouse Observatory, noted that in one case the extinction took an appreciable time, but in two others it was instantaneous; he also directs attention to the apparent unevenness of the shaded disc. M. Lebeuf, at Besançon, also noted this phenomenon, and describes the apparent rotation of the deeper coloration as the eclipse proceeded. The general transparency of the shadow, as compared with earlier eclipses, notably that of April 11, 1903, also attracted his attention.

M. Jonckheere, at the Hem Observatory, was able to see the penumbral shadow, with the naked eye, at 10h. 32m., and observed first contact with the shadow at 10h. 57m. 5s. (M.T. Hem). He also records that the meteorological observations, presumably delicate, indicated a sensible lowering of temperature during totality.

THE PROBABLE ERRORS OF RADIAL-VELOCITY DETERMINATIONS.—The radial velocities of stars are now being measured by many observers, not always with concordant results, and it becomes important that the probable errors of such observations should be investigated and defined with every care. In a paper in No. 3, vol. xxxii., of the *Astrophysical Journal* (p. 230), Mr. Plaskett deals with this subject, basing his discussion on exhaustive experiments he has made at the Ottawa Observatory. Many factors enter the problem, and one of the most important is the effect of dispersion. Mr. Plaskett finds that, contrary to expectation, the accuracy is not inversely proportional to the dispersion of the spectrograph used, only a